19. A system for ***digitally defining a color formed from at least two color models***, said system comprising:

means for ***selecting at least one color component from a first color model***;

means for ***selecting at least one additional color component from at least one other color model***; and

means for ***assigning percentages to each of said selected color components from said first color model and from said at least one other color model to create a user-defined color.***

7. A system for visually depicting a document having at least one spot color applied onto a document process color on a computer monitor screen, said system comprising:

means for ***defining the document process color***;

means for ***defining each of at least one spot colors*** to be applied onto the document process color;

means for ***applying shade values to each of said document process color***;

means for ***applying shade values to each of said at least one spot colors***;

means for ***defining a new color based on the shade values applied for each of said document process color and for each of said at least one spot color***; and

means for applying said defined new color to a document depicted visually on a computer monitor screen.

A document process color is a first color model while a spot color is a separate second color model. Shade values are the percentages of the components of the color models. The defined new color is the user-defined color that represents the combination of the first color model (document process color) and the second color model (spot color).

The highlighted elements clearly describe the elements that the Examiner indicates as missing from claim 19. The attorney for Applicant respectfully requests clarification from the Examiner as to how these limitations are not found in this claim or claim 7 as set forth below.

<u>Response to Claim Rejections 35 USC § 112</u>

Claims 1 – 19 were rejected in the third office action for the first time under 35 U.S.C. 112, first paragraph. The Office Action stated:

"In this regard, one of ordinary skill in the art would consider the RGB color space, which the application refers to as spot color, to be a device dependent color space, computer monitors utilize RGB color space, by the same token, the CMYK color space, which applicant refers to it as process color, is considered to also be a device dependent color space, printers operate on CMYK color space. In this regard, it's not clear how is it possible to select one component, for example, say cyan from the CMYK color space and add it to the RGB of a monitor and furthermore, why would one even want to manipulate a favorable RGB color space of a monitor by adding cyan?"

How is it possible to select one component and add it to the RGB of a monitor?

The answer to the first question of the Examiner as to how it is possible to select one component from a first color model and add it to a second color model, the Examiner is directed to the Detailed Description of a Preferred Embodiment of the Present Invention. Prior to the present invention, it was not possible to visual depict on a computer monitor colors represented by two different color models. One could select a color from a first color model, such as RGB or a second color model, CMYK, or from many other color models, but not combinations of both. However, often in designing print documents, a spot color is placed over a process color to provide a unique document. This is very common in high end documents. The actual printing process for such images is easily accomplished by providing an additional plate for each spot color in addition to the CMYK plates or by other common printing techniques. However, since, as the Examiner recognizes, this process is not commonly done on a computer monitor. Thus, particularly for pre-press operations, it was not possible to view on a computer monitor, an accurate depiction of a document having the combined color model components.

The present invention provides this capability as described in the application. The Examiner is directed to the Detailed Description of a Preferred Embodiment of the Present Invention set forth in part below:

"User Defined Meta-inks

Normally, a process color is made up of percentages of the primary colors of the process color model. The process color model CMYK will be used for descriptive purposes. In this instance, a particular shade of green color "New Green" formed from CMYK having the following percentages: 70% cyan, 10% magenta, 100% yellow and 0% black is used as a document color. The document designer may decide to add a spot color, such as a "varnish" spot color that is formed from RGB color model with 90% red, 100% green and 10% blue, in a light shade over the green document color for added effect, such as changing the surface appearance on the printed picture. The Varnish color can be created first.

This allows the Varnish to be used in other images or other documents. The Varnish spot color is created, in one particular embodiment of the invention by defining it as an RGB spot color with the above described RGB components. This is illustrated in Figure 1.

In this preferred embodiment, a "meta-ink" is created to depict this new color on a computer monitor screen. As shown in Figures 1 - 4, the meta-ink color is defined in a series of dialog boxes. The dialog box "Edit Color" is selected from a menu as shown in Figure 2 for editing colors by selecting the "New" button. Then, "Meta-ink" is selected in the menu choice of Color Models as shown in Figure 3. A name, such as Varnish Green, is given to the new color that is to be created in the Name menu. The Process Inks menu allows the selection of the color model, such as CMYK or Hexachrome. The process color onto which the varnish is to be added is created by choosing the appropriate components of the process color model and the RGB components. The appropriate shade values are applied to each of these components. In the above described document color, the document color that is being used is defined as cyan having a shade value of 70%, magenta having a shade value of 10%, yellow having a shade value of 100% and black having a shade value of 0%. (This is equivalent to the New Green document color described above.) The Varnish is then applied by selecting the previously defined RGB spot color "Varnish" and applying the desired shade value, such as a 10% shade value. The new color, named "Varnish Green", is then saved. This color can then be selected as the new document color as shown in Figure 4. The visual display of this new document color will be a more accurate depiction of the image which will be printed.

This procedure, in one preferred embodiment, is implemented as described in the flow charts illustrated in Figure 5. The meta-ink color is defined internally using a series of references between Document Colors. Each reference is a separate entity which specifies the meta-ink color the Spot or Process Color and the percentage (shade) of the meta-ink color on the spot or process color plate. References between each meta-ink color and each spot or process color are contained within the data structure of each of the references. Thus, any number of meta-ink colors can be attached to any number of colors. This procedure can be implemented in may ways, including various programming languages.

On-Screen Representation

The task of the on-screen representation of the meta-ink colors requires the determination of an RGB coordinate set for each of the meta-ink colors as they are created. In the preferred embodiment of the present invention, the meta-ink colors are actually modeled as transparent inks. In this sense, the inks act as photographic filters. A preferred embodiment of this representation is described in the flow chart illustrated in Figure 6.

As illustrated in Figure 6, the process begins with initializing the user-defined meta-ink color as M with the definition as discussed above. This definition of M will include the process color components, the spot color components and their respective shade values. Value C, the RGB coordinate set of M is declared as having three components, CR, CG, CB (Red, Green and Blue

components). M is examined to determine whether it has any process color components. If there are no process color components, then the value of C is set to the color White, that is, CR = CG = CB =1.0. If there are process color components in M, then these process color components are used to build a process color P while initially ignoring any contributions of non-process color components in M. Once P has been built, then well-known algorithms are used to convert P to RGB space. This result is then placed in C in lieu of the value for White.

S is then defined as the first spot color that is defined in M. (This would be the Varnish in the previous example). If there is no value for S, that is, there is no spot color defined in M, then C is computed and converted to the color model for the display, such as LAB, and this value is cached as M for future use. If there is a value for S, then the RGB value for that spot color is determined based upon the existing definition for that spot color. This value is placed in a temporary RGB color variable SC. SC is then shaded according to the shade value "s" of S as set forth in the definition of M (10% of the Varnish as described in the earlier example). Each component of S, that is, SCR, SCG, SCB , is shaded by the equation SCn=1+(SCn-1)(s). The effect of SC is then modeled onto C by the formula Cn=CnSCn for each of the RGB components. This is repeated for each of the spot colors found in the definition of M. The shaded value for the next spot color (SC) is then layered onto the previously determined value of C. Once the list of spot colors has been exhausted, then the final value of C is computed, converted to the appropriate color model and cached as the value of M for display purposes. Ideally, the final value of C is converted to the LAB color model, which is device independent.

The procedure takes advantage of the ability to get a good starting point RGB value if any process components are used. The remaining spot colors, if any, are treated as transparent inks with three "point" spectral values at Red, Green and Blue. No assumptions are made in regard to the wavelengths or any other spectral properties of the inks. The inks are treated as photographic filters which attenuate the existing "spectrum" made up of the current RGB value at any point in the process exactly as their RGB components.

Why manipulate a favorable RGB color space of a monitor by adding cyan?

As to the question of the Examiner as to why one would even want to manipulate a favorable RGB color space of a monitor by adding cyan, the Examiner is directed to the Background of the Invention in the patent application. In that section, particularly in paragraphs 4 – 9 (or paragraphs 005 -009 of the published application), this issue is discussed, as provided below:

> "A number of color models are currently used in electronic publishing, depending on the document to be created and the printing process to be used. These color models normally fall into two categories, "spot" colors and "process" colors. Spot colors require a separate plate, that is, an image of a page, for each spot color

used in the document. Spot colors are typically used for documents that only use one to three colors or for documents using special colors such as fluorescent colors, metallic colors or "proprietary" colors, such as a company color. Thus, spot colors are normally used for simple documents or for special colors.

Process colors are colors which are created by using percentages of primary color components, such as tints of cyan, magenta, yellow, and black (CMYK) that are blended together to create other colors. Process colors provide many more colors than spot colors for printing purposes and are normally used with documents containing color photography or other items using more than three colors. A document using process colors is separated into separate plates, each containing one of the component colors, such as four separate plates containing differing tints of four primary colors (CMYK). The process of splitting a composite document into its constituent plates and generating an image for each plate is called "separation".

One of the problems occurring with existing electronic publishing systems occurs when a document is created using process colors, but also requiring a spot color as well. For instance, a special color such as a fluorescent color or a metallic color may be used which can not be created using the process colors. Many documents may also require proprietary colors, such as in a company logo. For instance, a magazine having photography and a company logo may require both color models. Also, many high end publications may use a "varnish" or other special color layer to be applied over an image to create an added effect. A "varnish" may be a translucent color which tints an overall image or document to add a surface effect on the printed image. ***The addition of spot colors to a document using process colors is not a problem for the actual printing process.*** An additional plate is created for that particular spot color during the separation.

However, the adding of a spot color onto a document process color is a problem during the electronic design process. Presently, when such a spot color is applied during the design or layout phase of the publishing process, it is difficult to accurately depict on screen. Typically, during the design phase, the process document colors are converted to a color model which can be depicted on a computer monitor screen, such as RGB or LAB. However, the existing algorithms are unable to convert process colors which have been combined with spot colors. If an on-screen image using process colors is overlayed by the spot color, then that image is blocked from view. Typically, the designer will create two duplicate boxes, one containing the image and the other containing the spot color to be applied. The final image to be printed is not able to be accurately displayed prior to the actual printing of the image. This is of concern since neither the designer nor others later working with the document are sure of the final image.

Since process colors are normally used in most higher end documents, this is an important issue in the publishing industry. Thus, a problem exists in accurately depicting color documents during the electronic design of such documents."

This issue is further discussed in the Description of a Preferred Embodiment of the Present Invention, as set forth in part below:

> "During the design process, these colors must be accurately depicted on a computer monitor screen. However, colors or inks as displayed on a monitor screen are "additive" colors. Light is projected on the screen which is initially black. As colors are added, the closer the final color comes to white. The pixels of a computer monitor screen are red, green and blue, thus RGB or LAB color models are normally used to depict images on the screen. During the design of a document, the process colors used are converted to spot colors for depiction on a computer screen during the design phase.
>
> The present invention provides a capability to additionally modify the existing color models in order to more accurately depict the document colors when a spot color is added to a document created with process colors. One example of such a document would be a marketing brochure having photographs and a company logo using a proprietary color. Process colors are preferred for the photographs while a spot color may be necessary for the company logo. This may not be a problem for the printed image since an additional plate can be used for the spot color during separation. However, the depiction of this document may be difficult on a computer monitor screen as discussed in the background of the invention. It is very important that the spot colors be accurately represented on the screen for the printed piece match to the on-screen depiction. This representation is merely a stand-in for the color that is used at the actual print-time."

Response to Claim Rejections – 35 USC §102

As discussed in the remarks in the previous response, in order for the Patent Office to establish a prima facie case of anticipation, the Examiner **must** provide each of the following:

1. a single reference;

2. that teaches or enables

3. ***each of the claimed elements*** (as arranged in the claims)

4. expressly or inherently (and ***if inherently, it must necessarily result from the reference, not simply may result)***

5. as interpreted by one of ordinary skill in the art.

The anticipatory reference must describe the subject matter of the claims with sufficient clarity and detail to establish that the subject matter existed, and this existence was recognized by persons of ordinary skill in the field of the invention.

It is noted that the Examiner in the outstanding Office Action acknowledges that the prior art fails to describe the invention as set forth in independent claims 7 and 19. As stated in this

Office Action, "In this regard, it's not clear how is it possible to select one component, for example, say cyan from the CMYK color space and add it to the RGB of a monitor and furthermore, why would one even want to manipulate a favorable RGB color space of a monitor by adding cyan?" Thus there is no disclosure in the prior art of how and why one would select a component of a first color model and add it to a second color model for visual depiction or digital definition. The present invention acknowledges this problem and solves it.

The claims of the above-identified application were rejected in the Office Action as being anticipated by Gass, Jr. et al. In support of the alleged anticipation of the limitation in claims 2-19 of means for selecting at least one color component from a first color model; means for selecting at least one additional color component from at least one other color model and means for assigning percentages to each of said selected color components, the Office Action stated that:

> (please note, fig 8, in correlation to column 9, lines 55 -58, "If ***either of the RG or HLS color models*** is selected, then the percentages 192 are listed in terms of red, green, blue, or hue, luminance, saturation***, respectively***." (emphasis added)

Please note the emphasized portions for the means for selecting either of the color models, not both. The referenced means are to allow a particular color, either RGB or HLS, not both, to be edited by altering the percentage values of the components of that particular color model. No where in Gass, Jr. et al. is there a discussion, disclosure, suggestion or teaching of ***selecting a component from a first color model and a component from a different color model,*** assigning percentages to each of the selected color components from the first color model and from the second color model to create a user-defined color that ***represents the combination of the first color model component and the second color model component***. Glass, Jr., et al. merely allows one or the other color model to be selected to adjust the percentages of the components of the selected color model. Even taking the figure 8 in the most favorable light of the Office Action, only one or the other color model may be selected. For example, as shown in figure 8, the CMYK model is chosen which allows the Cyan, Magenta, Yellow, and Black color components to be adjusted. The example shown in Figure 8 does not allow the percentages of RGB, LAB or other color model components to be adjusted at the same time to create a user-defined color that represents the combination of two or more color models. This is further clarified in Col. 9, lines 54 – 58. Clearly, Gass Jr., et al. fails to anticipate the presently claimed

inventions, particularly, since Gass Jr., et al. fails to disclose the ability to select components of two or more separate color models in order to create a user defined color.

Gass, Jr. et al. is not concerned with the problem that the present invention solves. Gass Jr. et al. is attempting to allow users to modify EPS files without returning to the originating program. Gass, Jr. et al. discloses the ability to edit particular colors saved in EPS files. This is clarified in Column 6, line 63 through column 7 line 54. The system of Gass, Jr. et al. saves identifiable colors in a color EPS file in a color palette. These identifiable colors include spot colors and percentages of CMYK inks from all of the process color graphics. ***The palette differentiates between process and spot colors.*** This information is provided to commercial printers in order to create the number of separations for the printing process. A different separation is required for each of the different spot colors as well as for each of the CMYK inks. The system does allow colors to be added or modified within the palette. It also allows spot colors to be converted to process colors. ***It does not allow a user defined color to be created from components of a process color and from components of a spot color.*** It is an either/or system in editing colors in the Gass, Jr. et al. system. ***A particular color model is selected, and the percentages of the components of that color model may then be edited. See Figures 8, 9 and column 7, lines 20 – 54, column 9, line 45 – column 10, lines 19.*** No where does Gass, Jr. et al. discuss selecting two color models, and modifying the components of both color models to create a third color in the form of a process color. Figure 8 clearly shows this lack of capability. See the selection of a CMYK color model and the CMYK components.

Further, Gass, Jr. et al. is not concerned, nor does it disclose, suggest or otherwise teach the visual depiction of a color formed from two distinct color models. This limitation is set forth in claims 2 – 18.

In the outstanding Office Action, the Gass, Jr. et al. reference fails to teach or enable the claimed elements of defining a new color for visual depiction by combining the components of two separate color models. This reference fails to disclose defining a new color based on assigning percentages to each of the components of the two separate respective color models. Prior to the present invention, it has not been possible to accurately visually depict the combination of process colors and spot colors previously. Process colors are by definition subtractive colors in that the image begins white, then as process color components are added, the image darkens. Thus, process colors are preferred for printing purposes. Spot colors are by

definition “additive”. The image begins dark, such as on a computer monitor screen, and as color components are added, the image lightens. Thus spot colors are desired for radiant light sources. In previous systems, if a spot color has been added to a process color, the resulting displayed image is rendered brown. The printed image will be accurate, but the displayed image is not. The present invention is concerned with the depiction of the combined spot and process colors. Gass, Jr. et al on the other hand, is concerned with modifying the color of graphics in an EPS file without reverting back to the originating program.

Gass, Jr. et al. does not disclose, suggest, or teach in any manner assigning percentages to each of the color components of different color models to define a new color, or defining a new color for visual depiction by layering components of a spot color in accordance with shade values onto the components of a process color.

The Applicants respectfully submit that the inventions as set forth in claims 2 – 19 are not anticipated by Gass, Jr. et al. or any of the other prior art citations. The Applicants respectfully request that the claims be indicated as allowable over the prior art. The Examiner is respectfully requested to telephone the undersigned if further discussion would advance the prosecution of this application.

Respectfully submitted,

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